

ENVIRONMENTAL ANALYSIS AND DECISION ON THE NEED
FOR AN ENVIRONMENTAL IMPACT STATEMENT (EIS)

Form 1600-1

Rev. 6-2010

Department of Natural Resources (DNR)

Region or Bureau

Northern

Type List Designation

NR150.03(8)(f)8a

NOTE TO REVIEWERS: This document is a DNR environmental analysis that evaluates probable environmental effects and decides on the need for an EIS. The attached analysis includes a description of the proposal and the affected environment. The DNR has reviewed the attachments and, upon certification, accepts responsibility for their scope and content to fulfill requirements in s. NR 150.22, Wis. Adm. Code. Your comments should address completeness, accuracy or the EIS decision. For your comments to be considered, they must be received by the contact person before 4:30 p.m., **Wednesday, October 31, 2012.**

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Title of Proposal: Evaluation of a New Operating Order for the Rest Lake Dam

Location: Vilas County, Town of Manitowish Waters

Township Range Section(s): NW¹/₄, NW¹/₄, Section 9, Township 24 North, Range 5 East

PROJECT SUMMARY

1. Brief overview of the proposal including the DNR action

The Rest Lake Dam is located on the Manitowish River in Vilas County where the dam structure is incorporated into the County Highway 'W' bridge. The dam creates an impoundment, or reservoir, upstream that controls the water level on a chain of ten natural lakes and river channels known as the Manitowish Chain of Lakes (Figure 1). The terms impoundment, reservoir, and Chain of Lakes will be used interchangeably when referring to the water held back by the dam. Downstream, the Manitowish River flows through three small lakes and then travels about 15 miles where the Manitowish and Bear Rivers combine to become the Flambeau River (Figure 2). The current owner of the Rest Lake Dam is Xcel Energy which is part of the Chippewa and Flambeau Improvement Company (CFIC). The hydropower generated downstream resulting from the fall drawdown of the Manitowish Chain of Lakes has been evaluated by the Federal Energy Regulatory Commission (FERC). The Commission concluded that management of water levels and flows was "neither used and useful nor necessary or appropriate to maintain or operate" for hydro power generation. Currently, the operations of the Rest Lake Dam are

focused primarily on upstream water interests including minimizing possible ice damage to piers and shoreline structures, as well as keeping water levels above the dam in a narrow operating range near the maximum water level from June through October.

The current operation of the dam creates surface water levels and flows that are substantially different compared to the natural, annual pattern of levels and flows on northern Wisconsin lakes, rivers, and wetlands. This change in hydrology negatively affects the Manitowish River system upstream of the dam on the Chain of Lakes and downstream of the dam to the confluence with the Bear River. The Department of Natural Resources proposes to issue a new operating order to the owners of the Rest Lake Dam which specifies water levels and flows that balance and protect public water resource rights as well as life, health, and property, both upstream and downstream of the dam.

Figure 1. Chain of Ten Lakes above the Rest Lake Dam

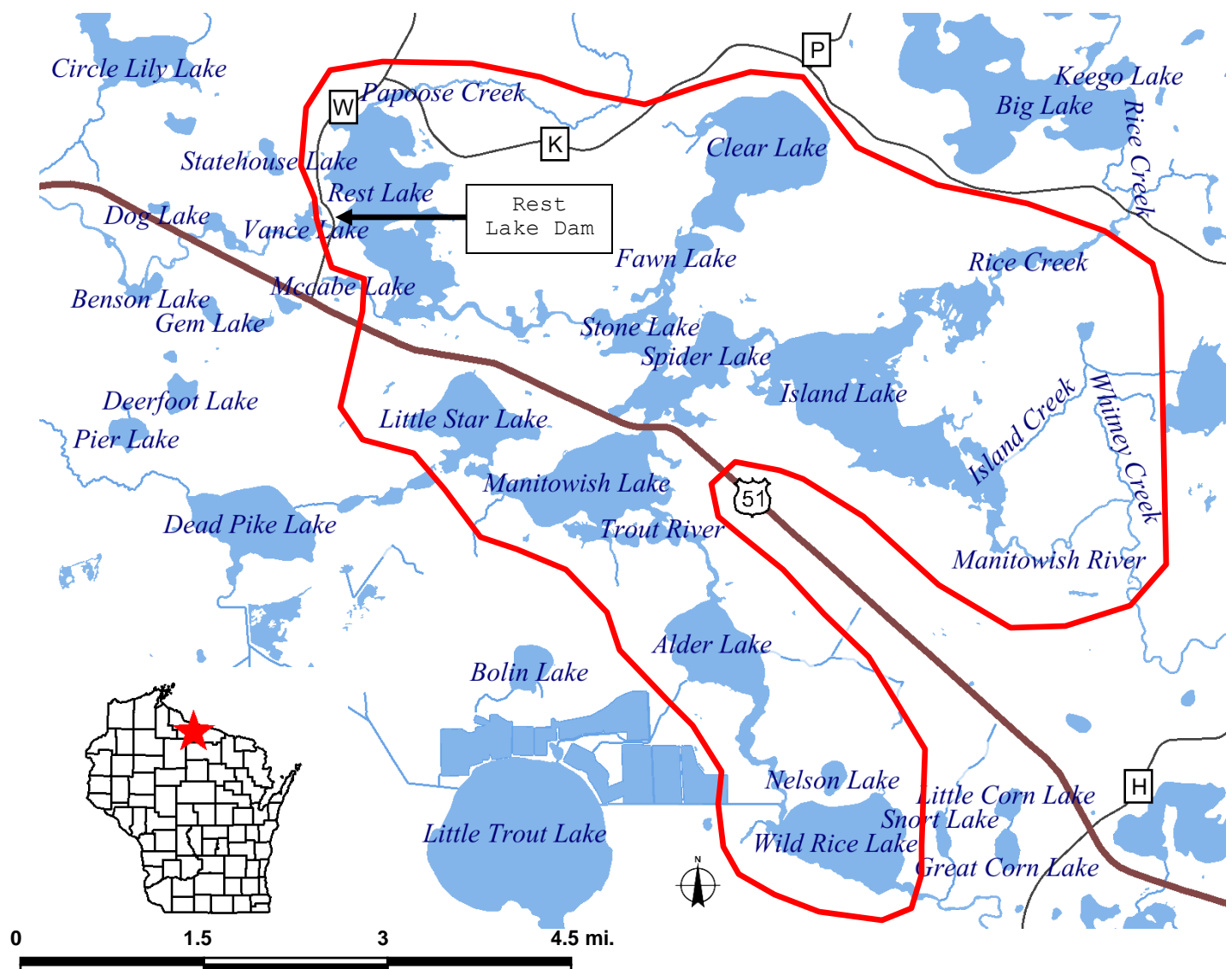
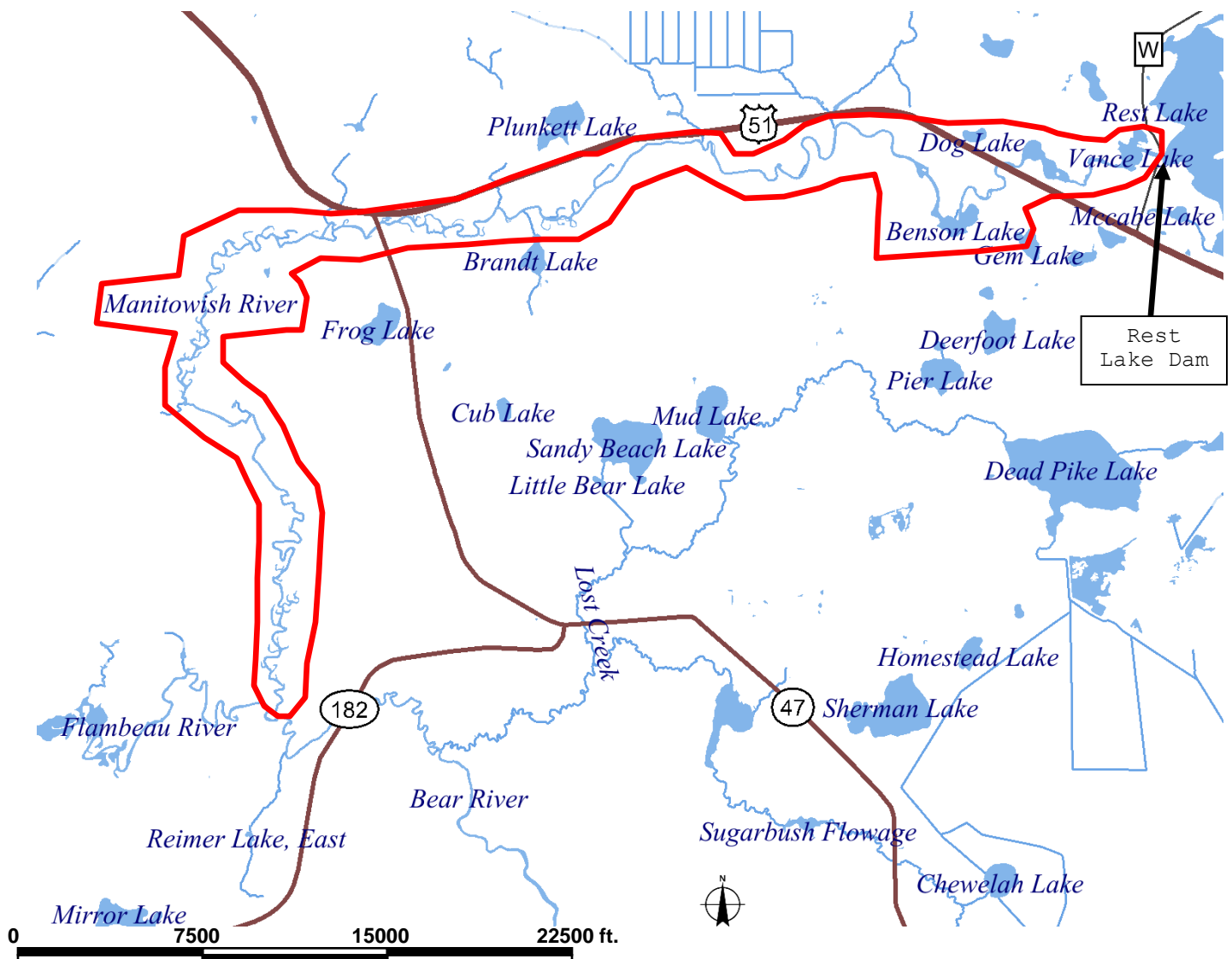


Figure 2. Manitowish River below the Rest Lake Dam



2. Purpose and Need (include history and background as appropriate)

The upper Manitowish River system was identified as a potential reservoir site over 130 years ago when officers from the United State Army Corps of Engineers were exploring the sources of the Mississippi, Saint Croix, Chippewa, and Wisconsin Rivers. Their report to Congress in 1879 identified the Rest Lake outlet as a potential site to raise water levels 25 feet to improve the navigation of the Flambeau and Chippewa River systems.

In 1887, a dam was built at the outlet of Rest Lake by the Chippewa Lumber and Boom Company for the purpose of storing water to release in the spring in order to float logs downstream. As the timber resources in the area were depleted, the water stored in the reservoir above the Rest Lake dam began to be utilized for other uses including flood control, navigation, and hydropower generation. In 1911, the Chippewa and Flambeau Improvement Company (CFIC) was granted authority by the Wisconsin legislature to construct,

acquire, and operate dams on the upper portions of the Chippewa and Flambeau Rivers according to the provisions and legislative intent of Chapter 640, laws of 1911 which are now recorded as Chapter 182.71, Wis. Stat. as follows:

“The company shall produce as nearly a uniform flow of water as practicable in the Chippewa and Flambeau rivers, by storing in reservoirs surplus water for discharge when the water supply is low, to improve the usefulness of the rivers for all public purposes, and to reduce flood damage.

If maintaining uniform flow throughout the length of these rivers is impracticable, the company shall maintain as nearly a uniform flow in the upper portions of these rivers as is practicable.”

It is important to note that the upper portions of the river that are referred to in these laws are meant to describe the water flow below and not above the Rest Lake Dam. By the early 1900's, CFIC operated the Rest Lake dam to provide water for occasional log drives on the Flambeau River, but the reservoir was primarily managed to store water for hydropower generation downstream. During this time, water levels on the Chain were held as high as 15 feet as recorded on the Rest Lake dam gage. The fluctuations of reservoir water levels were reviewed in 1914 by the Wisconsin Railroad Commission, which, at the time, was the state agency responsible for reviewing dam operations. During this operating order review, the citizen testimony identified potential impacts to hunting and fishing, shoreline erosion, and damage to shoreline structures associated with water level management on the reservoir. Based on the review by engineering staff as well as testimony provided by citizens, an 8' 0" maximum and a 5' 6" minimum water level was established for the reservoir.

In 1915, CFIC requested a rehearing on the operating order and requested that water storage of the reservoir be increased with a maximum water level elevation of 10' 0" and a minimum water level of zero feet in order to increase downstream power generation. During these hearings, the Railroad Commission reinforced the need to consider impacts on the reservoir, and the agency found that the CFIC request would cause excessive damage to the fishery and to shoreline property in an area that was already considered “one of the most famous summer resort and fishing waters in the state of Wisconsin”. The decision on the operating order was as follows:

“That the Chippewa and Flambeau Improvement Company maintain the level of the reservoir controlled by its Rest Lake dam located in section 9, township 42 north of range 5 east, in the town of Flambeau, Vilas county, Wis., with the least possible variation consistent with the proper use of said reservoir.

During all seasons of the year the Chippewa & Flambeau Improvement Company shall not permit the level of Rest Lake to exceed a point 14 feet below the top of the Railroad Commission's bench mark No.2 (8 feet 6 inches on the gauge board).

During all seasons of the year, except when the entire surface of Rest Lake is covered with ice, the Chippewa & Flambeau Improvement Company shall not permit the water to be drawn to a point lower than 17 feet below the top of the Railroad Commission's bench mark No.2, (5 feet 6 inches on the gauge board), and during the season of the year when the entire surface of Rest Lake is covered with ice the Chippewa & Flambeau Improvement Company may draw the water to a point not lower than 20 feet below the Railroad Commission's bench mark No.2 (2 feet 6 inches on the gauge board).”

In 1928, the operating order was modified to outline the conditions that needed to be met to provide water for log drives on the Flambeau River.

A fish ladder was built at the dam in 1930 that operated for several years. Additionally, in the mid 1930's the state built a fish hatching station below the Rest Lake Dam (Figure 3). The station was used into the

1940's and likely only had hatching jars that were used to produce walleye fry. The hatchery was taken out of production by the 1950's and fry rearing operations were consolidated at the Woodruff and Spooner hatcheries.



Figure 3: Manitowish River Fish Hatchery below the Rest Lake Dam.

Rest Lake Dam - Current Operating Order

Although the 1937/1939 order is the most recent operating order, Xcel Energy has not followed some of the provisions of this order. See the next section for a summary of current operations. The review that led to the 1937/1939 order started with a petition by local residents and resort owners to increase the winter minimum water level from 2' 6" feet to 6' 0" feet to avoid excessive winter fish kills on the Chain. At that time, the Public Service Commission of Wisconsin (PSC) was the state agency responsible for the review and issuance of dam operation orders. In response to the petition, the operating order was modified in 1937 and the conditions of that order were reconfirmed by the PSC in 1939. Although some changes were made to address concerns over the winterkill of fish on the reservoir, the PSC determined that a winter level of 6' 0" would "destroy the usefulness of the dam for its recognized primary purpose, which is the evening out of the flow of water in the stream in order to improve the generation of hydraulic power".

The 1937/1939 operating order (2-WP-295) is attached in Appendix I and the dam operation provisions of the order are outlined below:

"That the minimum reservoir level which may be maintained in the Rest Lake Reservoir at the dam during the period of November 1 to the time of the spring breakup of the ice shall be at a gauge height of 5 feet 0 inches.

From the time of the spring break-up until April 15, the water shall be raised to a minimum level of 7 feet 3 inches on the gauge, provided the minimum discharge required by law and rainfall and runoff will permit.

During the period from April 15 to July 1, the water shall be raised from 7 feet 3 inches to approximately 8 feet 6 inches, which is the maximum level which may be maintained at any time, provided the

minimum discharge required by law and rainfall and runoff will permit.

From July 1 to September 1, the water may be drawn not lower than a gauge height of 7 feet 3 inches.

From September 1 to November 1, the water may be drawn to a stage not lower than 5 feet 0 inches on the gauge.

At no time shall the reservoir be lowered at a rate exceeding 2 inches per day. At no time shall the reservoir be lowered after the ice sheet forms in the early winter and before the ice breaks up the following spring. The water surface may exceed the minimum levels fixed for the various periods of the year at any time, provided that the rate of lowering the reservoir thereafter does not exceed 2 inches per day.

Table 1. Summary of the 1939 Operating Order

Dates	Headwater Levels	Required Flows
November 1 to Spring thaw (initial runoff event, ~ 3 rd week of March).	Minimum of 5'0"	Run of River (1)
Spring thaw to April 15 (~ ice out on Chain)	Minimum of 7'3"	40 cfs or more
April 15 to July 1	7'3" - 8'6"	40 cfs or more
July 1 to September 1	No lower than 7'3" - 8'6"	40 cfs or more
September 1 to November 1	No lower than 5'0"	40 cfs or more

(1) Outflow equals inflow.

Current Operation of the Rest Lake Dam

After 1939, there was no further regulatory review of operations until the late 1990's when Federal Energy Regulatory Commission (FERC) studied the usefulness of the Rest Lake and Turtle Flambeau reservoirs for hydropower generation downstream. Even though the owners of the dam were a hydropower company, Chippewa and Flambeau Improvement Company argued that the operation of the Rest Lake Dam was not used for hydropower generation and, as such, should not be regulated by FERC. The following conclusions were made by FERC based on their evaluation of the usefulness of the Rest Lake and Turtle Flambeau reservoirs for downstream power generation. (FERC Docket Nos. UL96-16-006 and UL96-17-006, issued 2001).

"We have found that there are circumstances where a storage facility has an impact on generation at downstream licensed projects that is discernible, but nonetheless so insignificant that the storage facility cannot be found to be "used and useful" or "necessary or appropriate" for such generation and therefore is not subject to our jurisdiction.

We then applied that test to the facts at hand. We noted that in combination, operation of the Rest Lake and Turtle-Flambeau increases generation at downstream licensed hydro projects by 9 GWh, which is 5-6 percent of the total generation at those facilities. However, Rest Lake by itself increases generation by only 0.1 GWh, which amounts to approximately 0.06 percent of total downstream generation. We therefore conclude that Rest Lake is neither used and useful nor necessary or appropriate to maintain or operate the downstream projects. Accordingly, we granted rehearing and conclude that we have no jurisdiction over this reservoir."

Operating records of reservoir levels and dam discharge show that certain provisions and the overall intent of the 1939 operating order are not being followed. Based on the way the dam is currently being operated, it appears that water levels are being managed primarily for accommodating upstream water interests. By not capturing high spring runoff to bring the Chain to 7' 3" by April 15th as written in the 1939 order, the time needed to refill the Chain, the time that only minimum flows are passed downstream, and the probability that the Chain will not reach the 8'6" during low precipitation years are all increased. Spring refill, for example, does not begin until ice is 75% off of Rest Lake to avoid potential ice damage to



Figure 4. Picture of the Rest Lake Dam

permanent piers and boat houses. On average, refill begins on April 20th which is often after most of the high spring runoff events have passed through the dam. During the summer months, reservoir storage is not used to augment low flows downstream and water levels on the Chain are maintained in a narrow range between 8' 4" and 8' 6", not between 7'3" and 8'6" as specified in the 1939 order. When water levels drop below 8' 4", flows over the dam are quickly reduced to minimum flows. In the fall, to accommodate navigation during community events such as Colorama, the reservoir is maintained at 8' 6" until late September or early October. The drawdown to the target 5' 0" winter level could begin September 1st. By keeping the reservoir at the maximum level until late September or early October, the late draw down date combined with fall precipitation often results in the highest annual flow events below the dam.

Table 2. Summary of Current Annual Operations

Dates	Headwater Levels	Flows
November 8 to Spring ice breakup or ice out (75% ice off of Rest Lake) (~ April 20).	Minimum of 5'0"	Run of River
Spring break-up (~April 20) to July 1	5'0"- 8'6"	40 cfs of more
July 1 to September 28	No lower than 8'4"-8'6"	40 cfs or more
September 28 to November 8	No lower than 5'0"	40 cfs of more

At any time of year, the minimum river flow required at the dam stems from Chapter 31.34 Wis. Stat. which states that a dam must discharge at least 25% of the stream's natural low flow. This was calculated by estimating the Q_{7-10} flow which is defined as the lowest average flow for a consecutive seven-day period with an average recurrence interval of ten years. The Q_{7-10} is mainly used for the permitting of waste water discharges and these flows are not considered protective of aquatic life and habitat. In 2007, the USGS estimated the Q_{7-10} at 40 cubic feet per second (cfs).

Current Water Levels and Flows

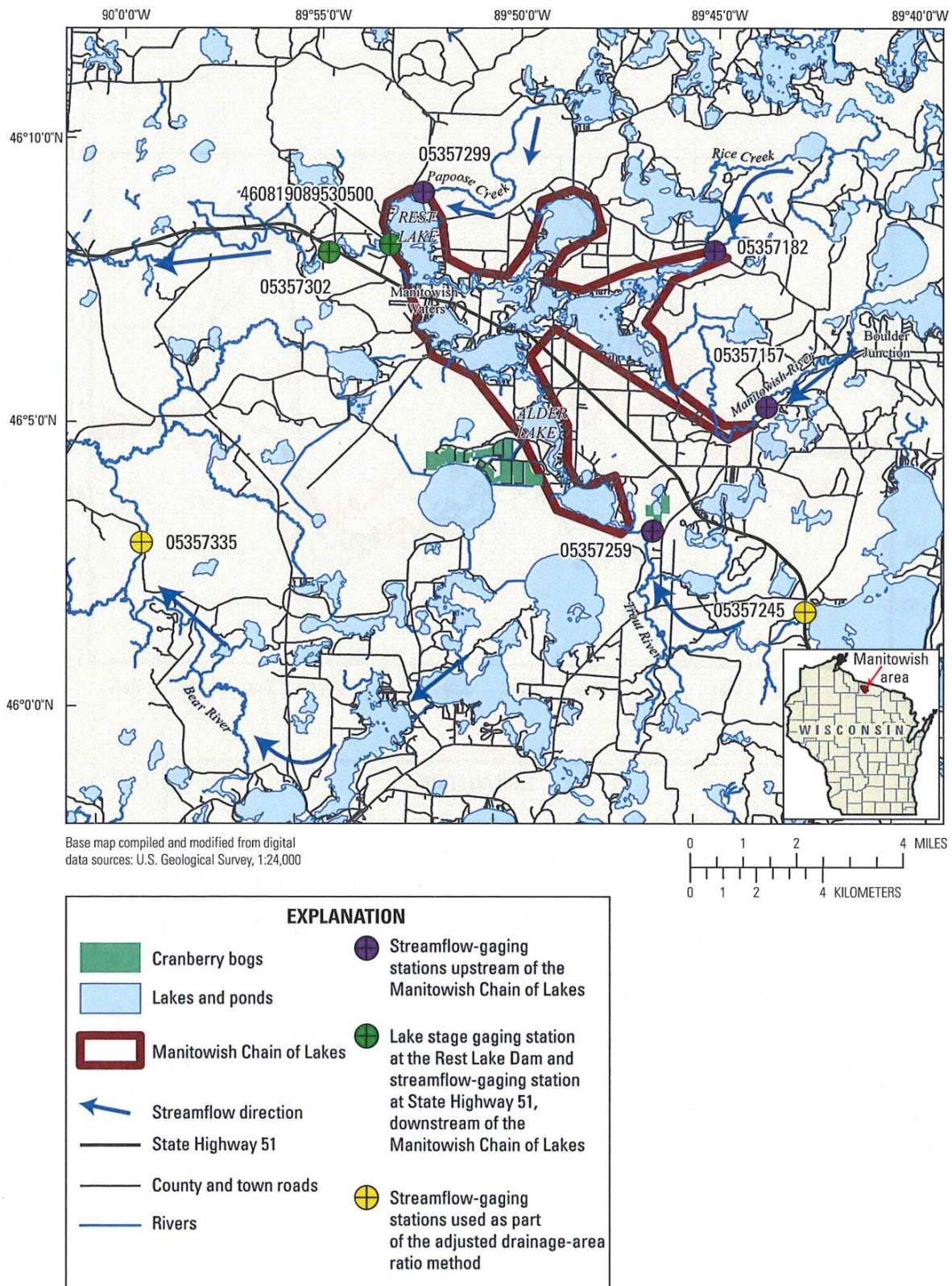
In November of 2009, the USGS placed gaging stations to record the flow on the three largest inflows to the Chain (the Manitowish River, Rice Creek, and Trout River), the water level elevation at the dam, and the river flows downstream of the dam (Figure 5). This information, along with historical dam operating records and nearby long term gaging stations on the Bear and Trout Rivers were used by USGS to develop inflow models for the Manitowish River at the Rest Lake Dam (the USGS report is included in Appendix II). The results of this study are described later in the section describing the natural pattern of flows on the Manitowish River system. The following web links can be used to view the data collected as well as the current water level and flow information. It is likely these stations will be discontinued in 2012 unless funding is found for their continued operation.

- Manitowish River near County Highway H
http://waterdata.usgs.gov/wi/nwis/nwisman/?site_no=05357157
- Rice Creek near County Highway K
http://waterdata.usgs.gov/wi/nwis/nwisman/?site_no=05357182
- Trout River near Boulder Junction
http://waterdata.usgs.gov/wi/nwis/nwisman/?site_no=05357259
- Rest Lake Water Level at the Dam
http://waterdata.usgs.gov/wi/nwis/nwisman/?site_no=460819089530500
- Manitowish River at Highway 51
http://waterdata.usgs.gov/wi/nwis/nwisman/?site_no=05357302
- Trout River at Trout Lake
http://waterdata.usgs.gov/wi/nwis/nwisman/?site_no=05357245
- Bear River near Manitowish Waters
http://waterdata.usgs.gov/wi/nwis/nwisman/?site_no=05357335

3. Authorities and Approvals (list local, state and federal permits or approvals required)

- **s. 31.02 Wis. Stats.** Regulation of Dams and Bridges Affecting Navigable Waters: Powers and duty of department.
- **s. 31.34 Wis. Stats.** Regulation of Dams and Bridges Affecting Navigable Waters: Flow of water regulated.
- **s. 182.71 Wis. Stats.** Miscellaneous Corporate Provisions: The Chippewa and Flambeau Improvement Company. History: 1979 c. 90 s. 20; 1979 c. 177; 1985 a. 182 s. 57; 1995 a. 196; 1997 a. 140; 1999 a. 150. Annotation Legislative Council Note, 1979: The Chippewa and Flambeau Improvement Company was created by ch. 640, laws of 1911, for the purpose of building, maintaining and operating dams and reservoirs on the Chippewa and Flambeau rivers. These improvements on the river serve to improve navigation, decrease the hazard of flooding and provide a uniform flow for all public purposes.
- **Wisconsin Constitution: Article IX, Section 1.** The Public Trust Doctrine: Wisconsin's Public Trust Doctrine is a body of constitutional, common (court-interpreted), and statutory law establishing public rights and the State's obligation to protect them in navigable bodies of water. The Trust Doctrine is based on ideas found in the Northwest Ordinance of 1887 and is incorporated into the Wisconsin Constitution. The Wisconsin Supreme Court has declared that the State holds navigable waters in trust for all citizens. The Trust Doctrine establishes the concept that public water rights such as water quality, quantity, scenic beauty, and recreational use need to be protected for the benefit of current and future generations.

Figure 5. Map showing the extent of the Manitowish River flowage and the gaging stations installed by USGS (from USGS report).



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